UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GUOQIANG XING,
KENNETH D. BRENNAN and PING JIANG

Appeal No. 2005-0811
Application No. 09/901,416

ON BRIEF

Before KIMLIN, GARRIS and JEFFREY T. SMITH, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-13.

Claim 1 is illustrative:

1. A method for forming interconnects, comprising:

providing a silicon substrate containing one or more electronic devices;

forming a first dielectric layer over said silicon substrate;

forming a second dielectric layer over said first dielectric layer wherein the dielectric constant of the second dielectric layer is less than 3.0;

forming a first hardmask layer over said second dielectric layer;

forming a second hardmask layer on said first hardmask layer wherein said second hardmask layer comprises a material selected from the group consisting of titanium aluminide (TiAl), titanium aluminum nitride (TiAlN), titanium nitride (TiN), aluminum nitride (AlN), tantalum aluminide (TaAl), and tantalum aluminum nitride (TaAlN);

forming a trench in said second dielectric; and

filling said trench with a conducting material.

The examiner relies upon the following references as evidence of obviousness:

Blosse et al. (Blosse)	6,399,512 B1	June 4, 2002 (filed June 15, 2000)
Flanner et al. (Flanner)	6,410,437 B1	June 25, 2002 (filed June 30, 2000)

Appellants' claimed invention is directed to a method for forming interconnects comprising first and second dielectric layers and first and second hardmask layers on a silicon substrate. The first hardmask layer may be SiN and the second hardmask layer may be TiN.

Appealed claims 1-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Flanner in view of Blosse.

Appellants submit at page 3 of the principal brief that "[c]laims 1-13 stand or fall together." Accordingly, all the appealed claims stand or fall together with claim 1.

We have thoroughly reviewed each of appellants' arguments for patentability. However, we are in complete agreement with the examiner that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the examiner's rejection for essentially those reasons expressed in the Answer.

Appellants do not dispute the examiner's factual determination that Flanner, like appellants, discloses a method of forming interconnects on a silicon substrate by forming the presently claimed first and second dielectric layers, as well as cap and antireflective layers. Appellants also do not contest the examiner's legal conclusion that it would have been obvious for one of ordinary skill in the art to substitute the hard inorganic layer of Blosse for the organic antireflective layer of Flanner. Indeed, Blosse teaches the equivalency of organic

antireflective layers and an inorganic dielectric layer of TiN (column 5, lines 50 et seq.).

It is appellants' principal contention that Flanner uses photoresist layer 2 as the mask, and not the cap and antireflection layers, 6 and 4, respectively. Appellants maintain that layers 4 and 6 of Flanner are not hardmask layers and that "[t]hey serve no masking function as that term is used in the instant invention" (page 4 of principal brief, penultimate sentence). Also, although appellants submit that a photoresist layer is not present during the etch process, they do agree with the examiner that the "comprising" language of claim 1 does not preclude the presence of a photoresist masking layer over the first and second hardmask layers.

Since cap layer 6 of Flanner may comprise SiN (column 4, line 65), and appellants do not contest the examiner's conclusion that antireflective layer 4 of Flanner may be TiN, the argued difference between the claimed method and the modified method of Flanner is one that is more semantical than substantive. While Flanner does not refer to layers 4 and 6 as mask layers, it is clear from Flanner's Figure 5 that layers 4 and 6, in addition to layer 2, function as a mask layer during the etching of layers 8 and 12. Inasmuch as appellants do not take issue with the

examiner's finding that layers 4 and 6 of Flanner may comprise the same material as appellants' first and second hardmasks, we perceive no meaningful distinction between methods encompassed by claim 1 on appeal and methods fairly taught by Flanner, particularly when one of the methods embraced by claim 1 includes a photoresist mask over the first and second hardmask layers.

Although we agree with appellants' analysis of the examiner's citation of Figures 20 and 21 of Flanner, we concur with the examiner that methods within the scope of claim 1 on appeal would have been obvious to one of ordinary skill in the art in view of the collective teachings of Flanner and Blosse.

As a final point, we note that appellants base no argument upon objective evidence of nonobviousness, such as unexpected results.

In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective Sep. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sep. 7, 2004)).

AFFIRMED

EDWARD C. KIMLIN)
Administrative Patent Judge)
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BRADLEY R. GARRIS) BOARD OF PATENT
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